**Special assignment Cryptography.**

Instructions:

Please solve the following seven cryptography problems.

Please include a detailed paragraph for each problem of at least five lines that explains how the solution was reached.

Problem 1. Solve the Caesar Cipher

Solve the following ciphertext:

VRRQS HRSOH EHJDQ VOLGL QJWKH DOSKD EHWEB DPRXQ WVGLI IHUHQ

Solution:

|  |
| --- |
| Soon people began sliding the alphabet by amounts differen |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| a | b | c | d | e | f | g | h | i | j | k | l | m | n | o | p | q | r | s | t | U | v | w | x | y | z |

* Begin with VRRQS, the first five-letter block of the ciphertext. Now beneath it write the five letters that would result by shifting each of the ciphertext letters to the right (or left) by one. On the next line, write the result by shifting each of the ciphertext letters to the right (or left) by two. Do this for each of the 26 possible shifts. This attack on a Caesar cipher is called “running the alphabet.”

0: vrrqs

1: uqqpr

2: tppoq

3: soonp

4: rnnmo

5: qmmln

6: pllkm

7: okkjl

8: njjik

9: miihj

10: lhhgi

11: kggfh

12: jffeg

13: ieedf

14: hddce

15: gccbd

16: fbbac

17: eaazb

18: dzzya

19: cyyxz

20: bxxwy

21: awwvx

22: zvvuw

23: yuutv

24: xttsu

25: wssrt

Problem 2. Solve the Playfair Cipher

Using the keyword “***heart*** “make your own square like that in the Wheatstone/Playfair example to decipher the following message:

kr ah kr rh he ck rd aw

Solution:

|  |
| --- |
| meet me at the cafe x |

* Deciphering tips: Using the keyword, “***heart***”, place the keyword in the 5-by5 matrix and fill in the unused cells with the remaining alphabet in sequence. Deciphering works as follows:
  1. If both letters are in the same column, the letter above each ciphertext letter is the plaintext.
  2. If both letters are in the same row, the letter to the left of each ciphertext letter is the plaintext.
  3. Both columns and rows wrap around on themselves. If the letter to be decoded is in the top row or leftmost column, the plaintext is the corresponding letter in the bottom row or rightmost column.
  4. Letters which are neither in the same column or row can be viewed as opposite corners of a rectangle. The plaintext letters in this case are at the remaining two corners of the rectangle.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| H | E | A | R | T |
| B | C | D | F | G |
| I/J | K | L | M | N |
| O | P | Q | S | U |
| V | W | X | Y | Z |

Problem 3. Solve the Vigenere Cipher

Encipher the following plaintext “***Richard Tapia***” using the keyword “***rice***” using the Vigenere Cipher.

Solution:

|  |
| --- |
| iqelrzf kirmr |

A screenshot of a computer

Description automatically generated with low confidence

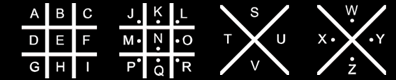
Problem 4. Solve the PIGPEN Cipher

Your mission, should you decide to accept it, is to decode the following name of a popular food item and to find out why it disappeared suddenly several years ago, without a trace:



Solution:

|  |
| --- |
| EXTREME DORITOS |



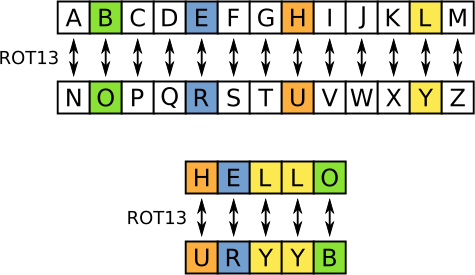
Problem 5. Solve the ROT13 Cipher

Test your cryptoanalytic skills on this ciphertext to find out where you will be going on your spring break in 2013. Our intelligence sources have determined that it has been encrypted with either ROT13, 2ROT13 or 3ROT13:

NPNCHYPBZRKVPB

Solution:

|  |
| --- |
| Acapulco mexico |



Problem 6. Solve the ATBASH Cipher

Please make flight reservations to the following top secret location immediately to meet your contact. This information was considered too sensitive for triple AES-256 so instead we asked Dan Brown himself to encrypt this using the virtually unbreakable ATBASH cipher.

DZHSRMTGLMWX

Solution:

|  |
| --- |
| washingtondc |
| Table  Description automatically generated | |

Problem 7. Solve the ROUTE Cipher

Use the 4x8 table below to solve the following ROUTE transposition cipher to find the hidden song lyrics. The key for the cipher is “spiral inwards clockwise from the upper right square”. Hint: It might be advisable to use a pencil.

LINAOSMNSLUGEMSAOAEGASAAIAATGLDM.

Solution:

|  |
| --- |
| ME GUSTA LA GASOLINA DAME MAS GASOLINA |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| M | S | A | O | A | E | G | L |
| E | T | G | L | D | M | A | I |
| G | A | A | I | A | A | S | N |
| U | L | S | N | M | S | O | A |